# Overview of RCRA Corrective Action

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EPA Region 3

RCRA Inspectors Workshop
Rehoboth, DE
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# RCRA Corrective Action

- What is Corrective Action?
- Who is subject to RCRA Corrective Action?
- How is it implemented?
- What are the requirements?
- What are EPA's program goals?
- What are the Cleanup Goals for Facilities?
- How can we incorporate Reuse/Redevelopment?

# What is RCRA Corrective Action?

- **Taking action** *(interim measures, assessment, cleanup)…*
- **in response to a release** *(spilling, dumping, leaking, etc., including historical releases)…*
- **of hazardous waste or hazardous constituents** *(including product releases)…*
- **from a RCRA facility**

# RCRA Corrective Action

- Corrective action for Regulated Units
  - (base program)
- Corrective action for Solid Waste Management Units (SWMUs)
  - (HSWA corrective action)
- Site-wide corrective action
  - (incl. HSWA; § 7003 imminent & substantial endangerment; § 3013)
- Corrective action for Underground Storage Tanks

# Region 3 Facilities

## Subject to RCRA*

- 23,536 small quantity generators
- 2,959 large quantity generators
- 665 current & former treatment, storage, & disposal facilities (TSDs)
  - Priority:
    - 347 high
    - 130 medium
    - 188 low
- Underground Storage Tanks
  - 73,526 active
  - 159,939 closed tanks
  - 40,673 confirmed release

* Numbers approximate and constantly changing…

# How do we implement RCRA Corrective Action?

## (Authorities/Mechanisms)

By States after Program Authorized

- **Permits**
  - § 3004(u)
  - § 3004(v)
  - § 3005(c)(3)

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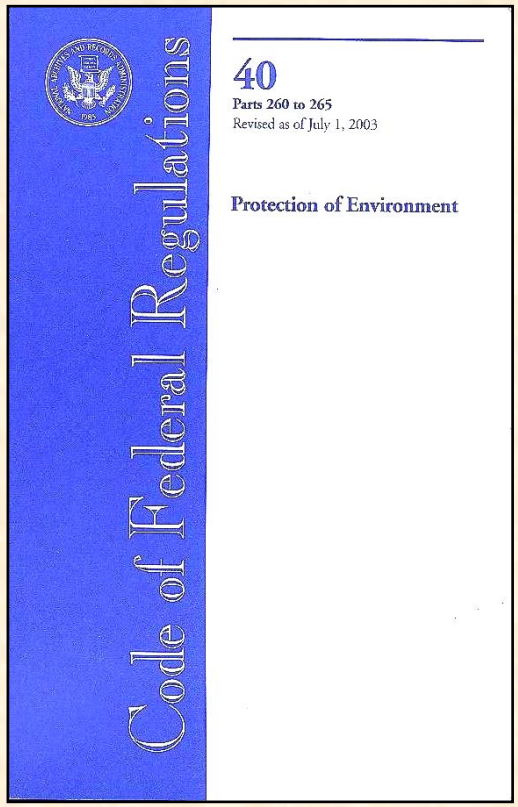
- **Orders**
  - § 3008(h)
  - § 7003
  - § 3013

- **Other**
  - Voluntary actions
  - Facility lead agreements
  - State VCPs
  - State orders
  - CERCLA

Bottom line: use whatever works – mechanism is unimportant as long as the work gets done

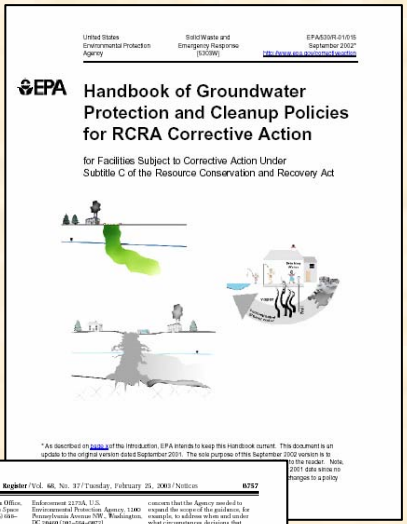
# Corrective Action
## requirements

- EPA has not promulgated comprehensive cleanup regulations under RCRA Subtitle C
- 40 CFR 264.100 (regulated units)
- 40 CFR 264.101 (SWMU)
- 40 CFR 264 Subpart S (special provisions for cleanup, e.g., CAMU, TU, Staging Piles
- Implemented primarily through guidance (including proposed rules)
- Approved work plans become enforceable under Permits & Orders



# Corrective Action Guidance

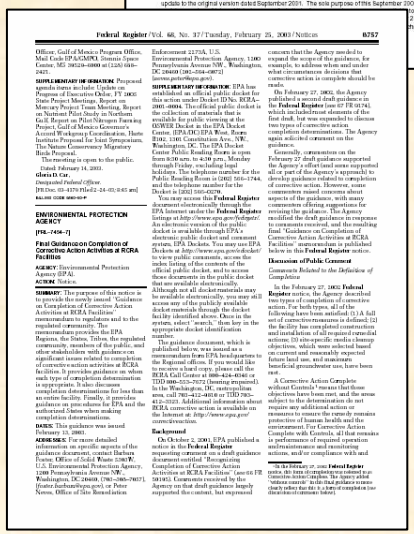
- Groundwater Handbook
  - September 2001 (with updates in 2004)
- Federal Register Notices
  - 1996 Advance Notice of Proposed Rulemaking (ANPR)
  - 2003 Final Guidance on Completion
- Web resources
  - http://www.epa.gov/correctiveaction
  - http://www.epa.gov/reg3wcmd/ca/ca_resources.htm


United States Environmental Protection Agency | Solid Waste and Emergency Response (5305W) | EPA530/R-01/015 September 2002

EPA

Handbook of Groundwater Protection and Cleanup Policies for RCRA Corrective Action

for Facilities Subject to Corrective Action Under Subtitle C of the Resource Conservation and Recovery Act


Federal Register / Vol. 68, No. 37 / Tuesday, February 25, 2003 / Notices 8757

ENVIRONMENTAL PROTECTION AGENCY

[FRL–7456–7]

Final Guidance on Completion of Corrective Action Activities at RCRA Facilities

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice.

SUMMARY: The purpose of this notice is to provide the newly issued ''Guidance on Completion of Corrective Action Activities at RCRA Facilities'' memorandum to regulators and to the regulated community. The memorandum provides the EPA Regions, the States, Tribes, the regulated community, members of the public, and other stakeholders with guidance on significant issues related to completion of corrective action activities at RCRA facilities. It provides guidance on when such type of completion determination is appropriate. It also discusses completion determinations for less than an entire facility. Finally, it provides guidance on procedures for EPA and the authorized States when making completion determinations.

DATES: This guidance was issued February 13, 2003.

ADDRESSES: For more detailed information on specific aspects of this guidance, contact Peter Nelson, Office of Solid Waste (5306W), U.S. Environmental Protection Agency, 1200 Pennsylvania Avenue NW., Washington, DC 20460, (703–308–7027), (nelson.peter@epa.gov); or Peter Nelson, Office of Site Remediation Enforcement (2273A, U.S. Environmental Protection Agency, 1200 Pennsylvania Avenue NW., Washington, DC 20460 (202–564–6027), (nelson.peter@epa.gov).

SUPPLEMENTARY INFORMATION: EPA has established an official public docket for this action under Docket ID No. RCRA–2001–0004. The official public docket is the collection of materials that is available for public viewing at the OSWER Docket in the EPA Docket Center, EPA/DC/EPA West, Room B102, 1301 Constitution Ave., NW., Washington, DC. The EPA Docket Center Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566–1744, and the telephone number for the Docket is (202) 566–0276.

You may access this Federal Register document electronically through the EPA Internet under the Federal Register listings at http://www.epa.gov/fedrgstr/. An electronic version of the public docket is available through EPA's electronic public docket and comment system, EPA Dockets. You may use EPA Dockets at http://www.epa.gov/edocket/ to view public comments, access the index listing of the contents of the official public docket, and to access those documents in the public docket that are available electronically. Although not all docket materials may be available electronically, you may still access any of the publicly available docket materials through the docket facility identified above. Once in the system, select ''search,'' then key in the appropriate docket identification number.

The guidance document, which is published below, was issued as a memorandum from EPA headquarters to the Regional offices. If you would like to obtain a copy, you may call the RCRA Call Center at 800–424–9346 or TDD 800–553–7672 (hearing impaired). In the Washington, DC, metropolitan area, call 703–412–9810 or TDD 703–412–3323. Additional information about RCRA corrective action is available on the Internet at *http://www.epa.gov/correctiveaction.*

Background

On October 2, 2001, EPA published a notice in the Federal Register announcing the availability of guidance document entitled ''Interim Guidance Completion of Corrective Action Activities at RCRA Facilities'' (see 66 FR 50913). Comments received by the Agency on that draft guidance largely supported the content, but expressed concern that the Agency needed to expand the scope of the guidance, for example, to address when and under what circumstance decisions that corrective action is complete should be made.

On February 27, 2002, the Agency published a second draft guidance in the Federal Register (see 67 FR 9136), which included most elements of the first draft, but was expanded to discuss two types of corrective action completion determinations. The Agency again solicited comment on the guidance.

Generally, commenters on the February 27, 2002 notice supported the Agency's effort (and some supported all or part of the Agency's approach) to develop guidance related to completion of corrective action. However, some commenters raised concerns about aspects of the guidance, with many commenters offering suggestions for revising the guidance. The Agency modified the draft guidance in response to comments received, and the resulting final ''Guidance on Completion of Corrective Action Activities at RCRA Facilities'' memorandum is published below in this Federal Register notice.

Discussion of Public Comment

*Comments Related to the Definition of Completion*

In the February 27, 2002, Federal Register notice, the Agency described two types of completion of corrective action. For both types, all of the following have been satisfied: (1) A full set of corrective measures is defined; (2) all RCRA units have been addressed; and (3) and installation of all required corrective actions; (4) site-specific media cleanup objectives, which were selected based on current and reasonably expected future land use, and maximum beneficial groundwater use, have been met.

A Corrective Action Complete without Controls * means that those objectives have been met, and the areas subject to the determination do not require any additional action or measures to ensure the *remedy* remains protective of human health and the environment. For Corrective Action Complete with Controls, all that remains is performance of required operation and/maintenance and monitoring actions, and/or compliance with and

# EPA Corrective Action Program Goals

achieving results in Region 3

- 2005 (284 High Priority facilities)
  - Human Exposures Under Control (99%)
  - Migration of Contaminated Groundwater Under Control (78%)
- 2008 (289 High Priority facilities)
  - Human Exposures Under Control at 95%
  - Migration of Contaminated Groundwater Under Control at 80%
  - Remedy Selected at 30%
  - Construction Complete at 20%
- 2020 ( ~ 611 facilities, High, Medium, & Low)
  - Human Exposures Under Control at 100%
  - Migration of Contaminated Groundwater Under Control at 100%
  - Construction complete at 100%

# Corrective Action

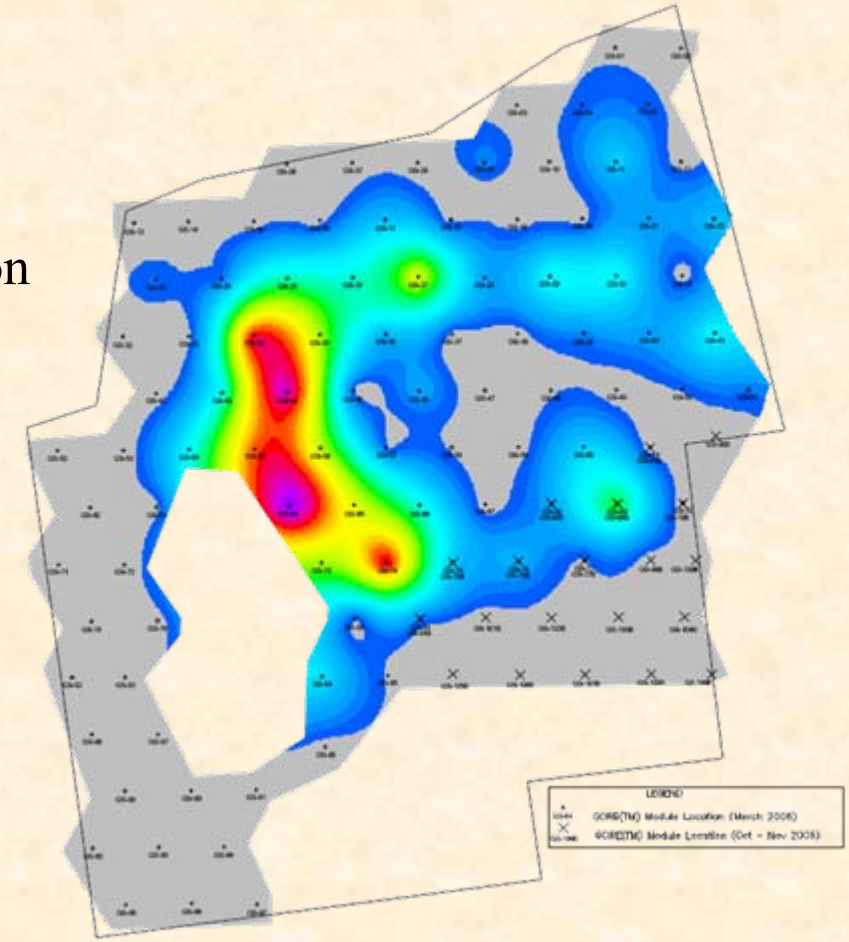
## achieving results at specific sites

- Process
  - Initial site assessment (RFA)
  - Site characterization (RFI)
  - Interim measures (IM)
  - Evaluation of remedial alternatives (CMS)
  - Remedy selection (SB/FDRTC)
  - Remedy implementation (CMI)

- Goals
  - Short-term protection
  - Intermediate performance
  - Final cleanup

# Site Characterization

- Goals
  - Define horizontal & vertical extent
  - Characterize sources
  - Identify actual & potential receptors
  - Collect data to assist remedy selection
- Approach
  - Develop conceptual model
  - Identify key decisions
  - Establish Data Quality Objectives
  - Develop sampling and analysis plan
  - Collect & analyze data
  - Assess data quality
  - Make a decision

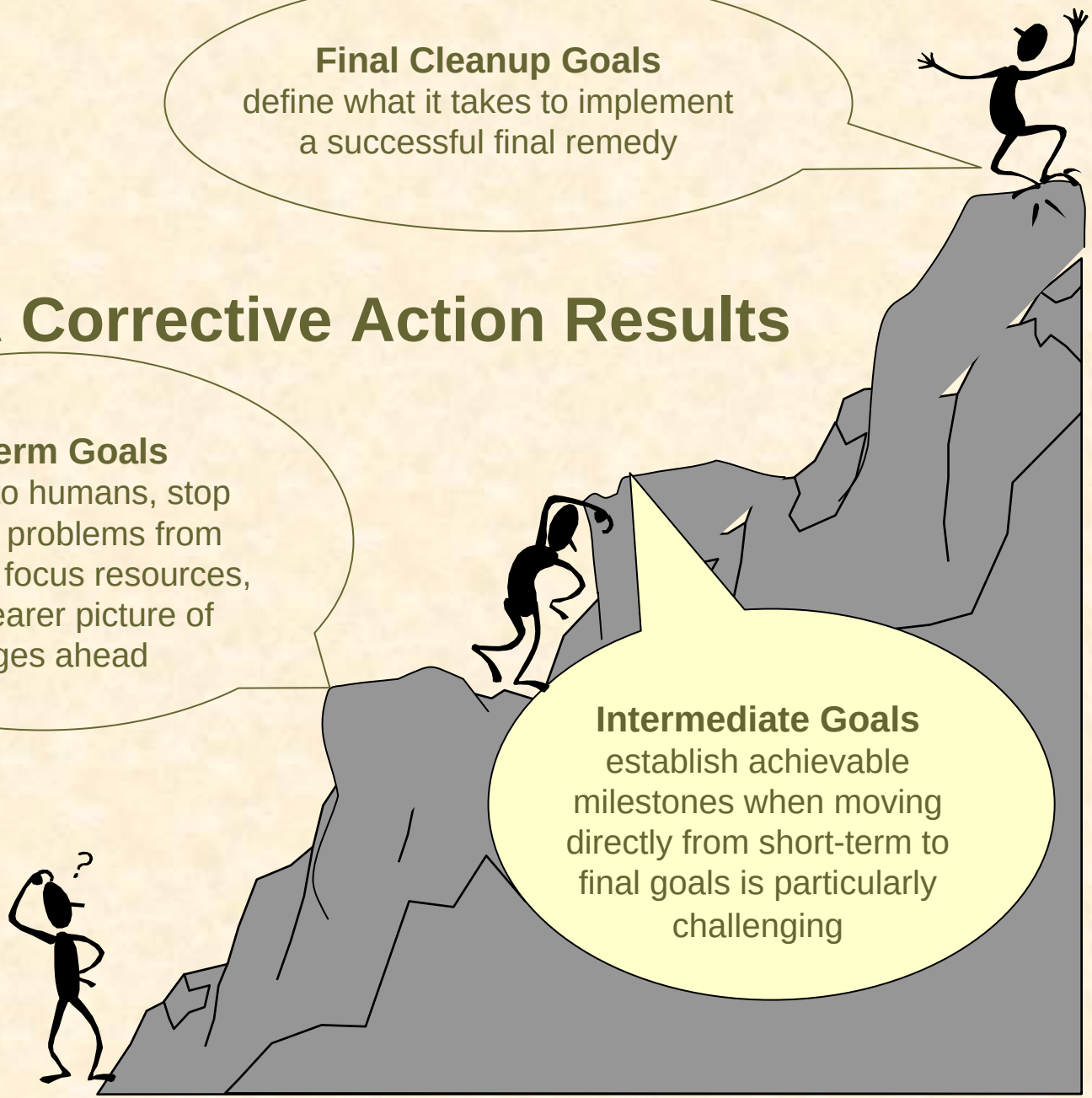


# RCRA Corrective Action Results

**Final Cleanup Goals**
define what it takes to implement a successful final remedy

**Short-Term Goals**
control risks to humans, stop groundwater problems from getting bigger, focus resources, help give clearer picture of challenges ahead

**Intermediate Goals**
establish achievable milestones when moving directly from short-term to final goals is particularly challenging



# RCRA Short-Term Protection Goals
## (Environmental Indicators)

- Ensure:
  - Humans are not being exposed to unacceptable levels; and
  - Contaminated groundwater is not migrating above levels of concern

# RCRA Intermediate Performance Goals

- Demonstrate progress
- Facility specific
- EPA encourages intermediate goals to:
  - focus resources
  - improve environmental conditions
  - enhance performance of cleanups
- Consistent with phased approaches
- Examples:  source control, off-site plumes

# Final Cleanup Goals

- RCRA - Three threshold criteria:
  - Protect human health and environment
  - Achieve “media cleanup objectives”
  - Control sources to the extent practicable

# Remedy Selection

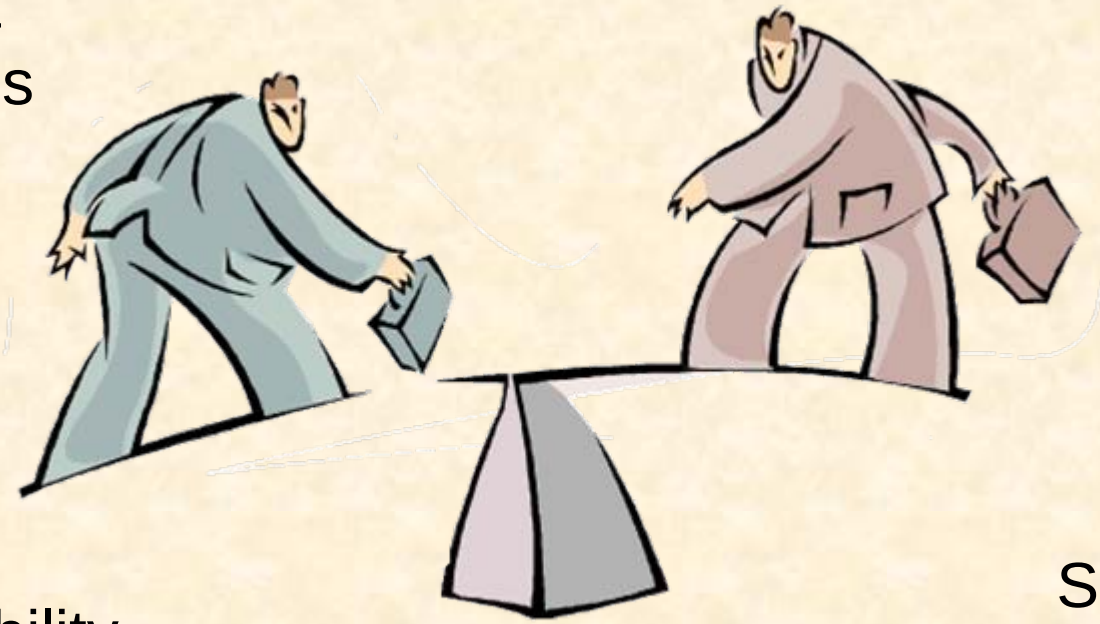
- Threshold Criteria
  - Protect Human Health & Environment
  - Achieve Media Cleanup Objectives
  - Control sources
- Balancing Criteria
  - Long-term reliability & effectiveness
  - Reduction of toxicity, mobility, or volume
  - Short-term effectiveness
  - Implementability
  - Cost
  - Community Acceptance
  - State Acceptance

# Balancing Criteria

Cost

Public acceptance

Long-term reliability & effectiveness



State acceptance

Implementability

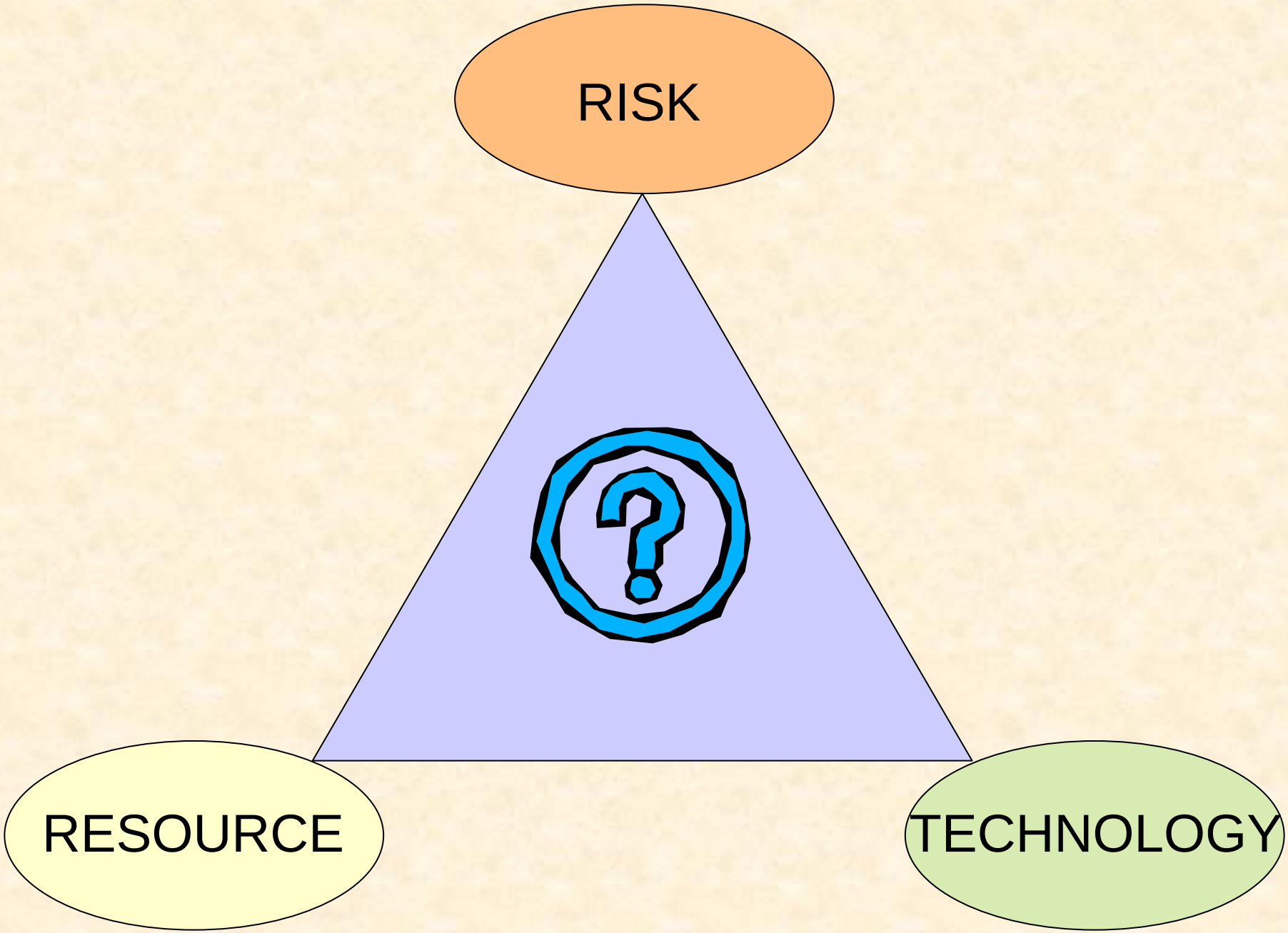
Short-term risks

Reduction of toxicity, mobility, or volume

# Media Cleanup Objectives

- Cleanup Levels
- Point of Compliance/Area of Attainment
- Cleanup Time Frame

what where when who why how

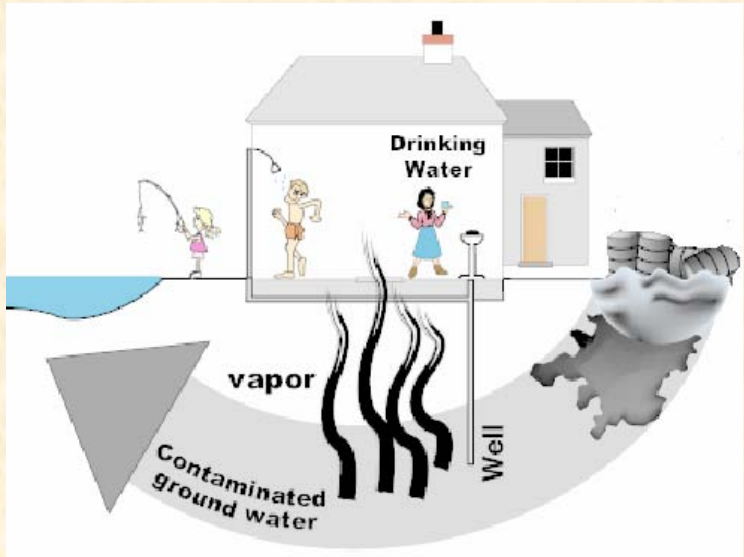

RISK
RESOURCE
TECHNOLOGY

# Cleanup Levels

- Risk-based
  - Risk range for carcinogens ($10^{-6}$ to $10^{-4}$)
  - Hazard quotient $\leq 1$ for non-carcinogens
- Default values
- Background

# Risk Assessment

- Purpose
  - Identify and characterize current and future potential risks posed by the site
- Components
  - Identification of contaminants
  - Assessment of exposure
  - Assessment of toxicity



# Sources of Information


# Existing Standards

- Maximum Contaminant Levels (MCLs)
- Non-Zero Maximum Contaminant Level Goals (MCLGs)
- Water Quality Criteria

# Media Cleanup Objectives

- **Cleanup Levels**
- Point of Compliance
- Cleanup Time Frame

# Cleanup Levels

- Soil
  - Land use (residential, industrial)
- Groundwater
  - Maximum beneficial use
  - Groundwater use designations
  - Other exposure pathways (e.g., vapor intrusion)
  - Discharge to surface water
- Technical impracticability

# Groundwater Cleanup Level

- EPA goal:  Return usable groundwater to maximum beneficial use
- Within the range of reasonably expected uses and exposures, maximum beneficial use is the one which warrants the most stringent groundwater cleanup level

# Groundwater Cleanup Level
## examples

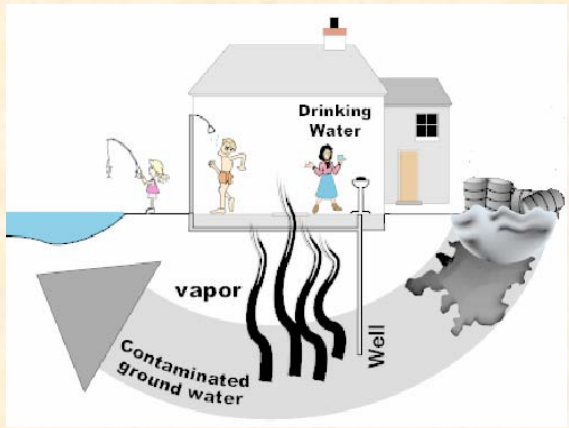
- Groundwater nearby is used as drinking water supply:
  - Maximum beneficial use = drinking water
  - Cleanup level is MCL
- Groundwater nearby not currently used for drinking water, but is in a high yielding, low TDS aquifer:
  - Reasonable that it could be used as drinking water supply
  - Maximum beneficial use = drinking water
  - Cleanup level is MCL

# Groundwater Cleanup Level
## examples, continued

- Groundwater is within an area designated by a government entity as not allowed for drinking water use:
  - Other uses are allowed (e.g., non contact cooling, car wash, etc.)
  - The range of reasonably expected uses is evaluated (e.g., see list)
  - Cleanup levels developed for each use
  - Maximum beneficial use is the one with the lowest cleanup level.

# Groundwater Use Designations

- Based on use, value and vulnerability
  - State-wide system
- Examples of factors to consider:
  - Quantity, quality, and yield
  - Reasonably expected future use
- Other key messages:
  - Discourages current use as only factor
  - States can define use (e.g., CSGWPP, more stringent State Standards, etc.)
  - Many states designate all gw as drinking water



# Media Cleanup Objectives

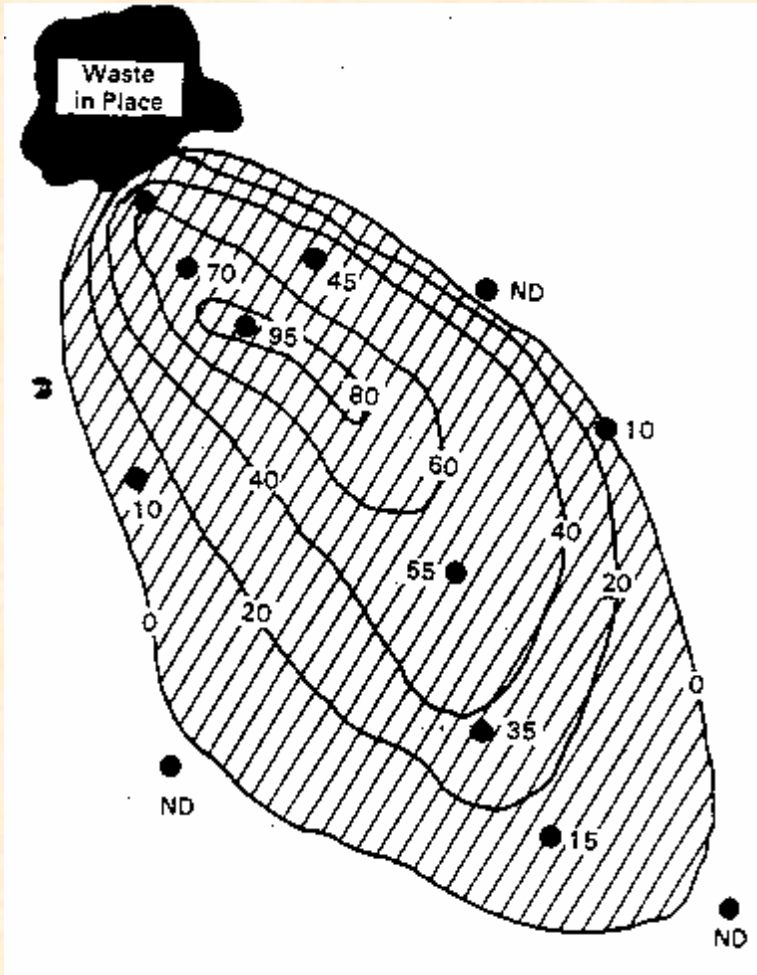
- Cleanup Levels
- **Point of Compliance**
- Cleanup Time Frame

# Point of Compliance

- Where a facility should monitor and achieve facility-specific goals
- How much of the groundwater must be cleaned up?
  - Throughout the plume
  - Waste unit boundary if waste left in place
  - Boundary of TI zone

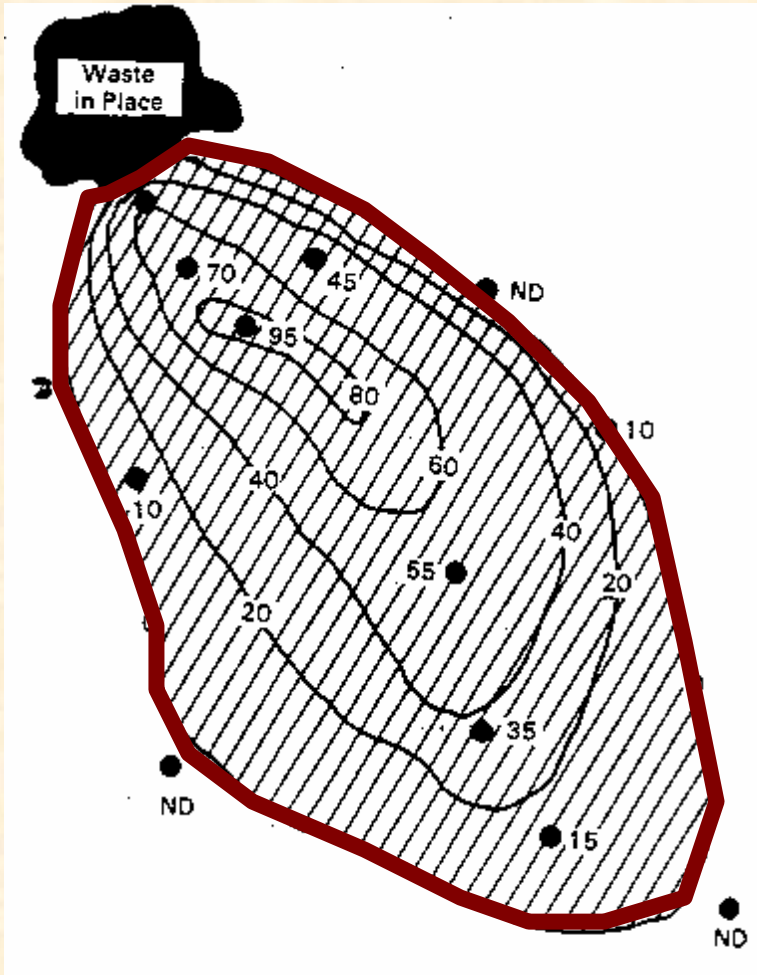
# RCRA Point of Compliance

## Based on Goal



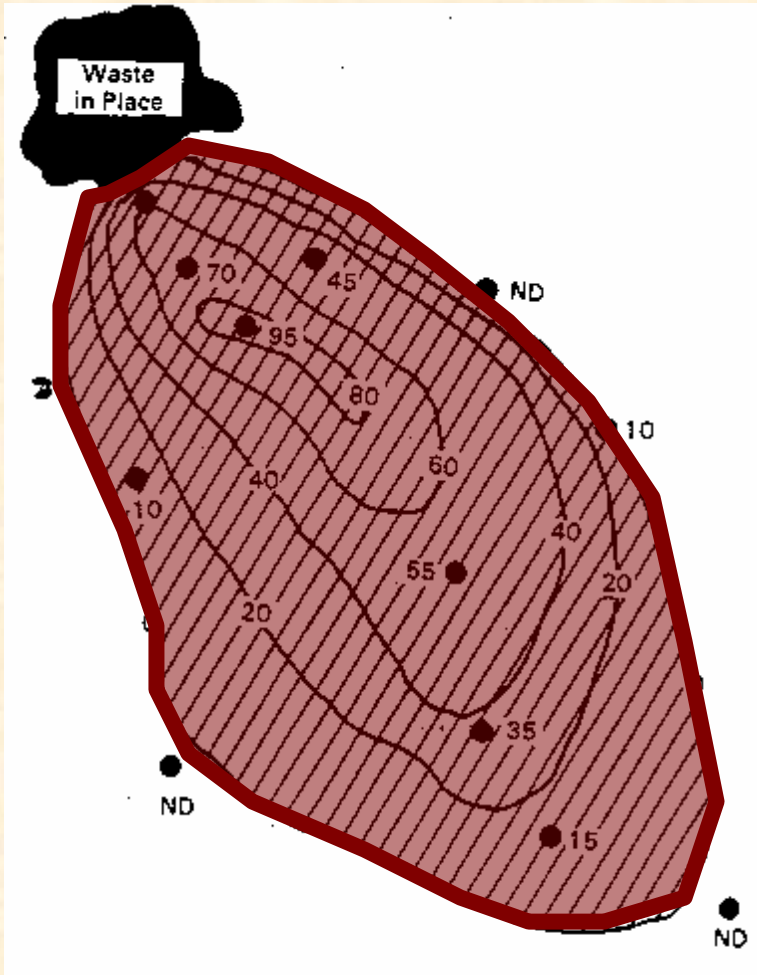
# RCRA Point of Compliance

## Short-Term



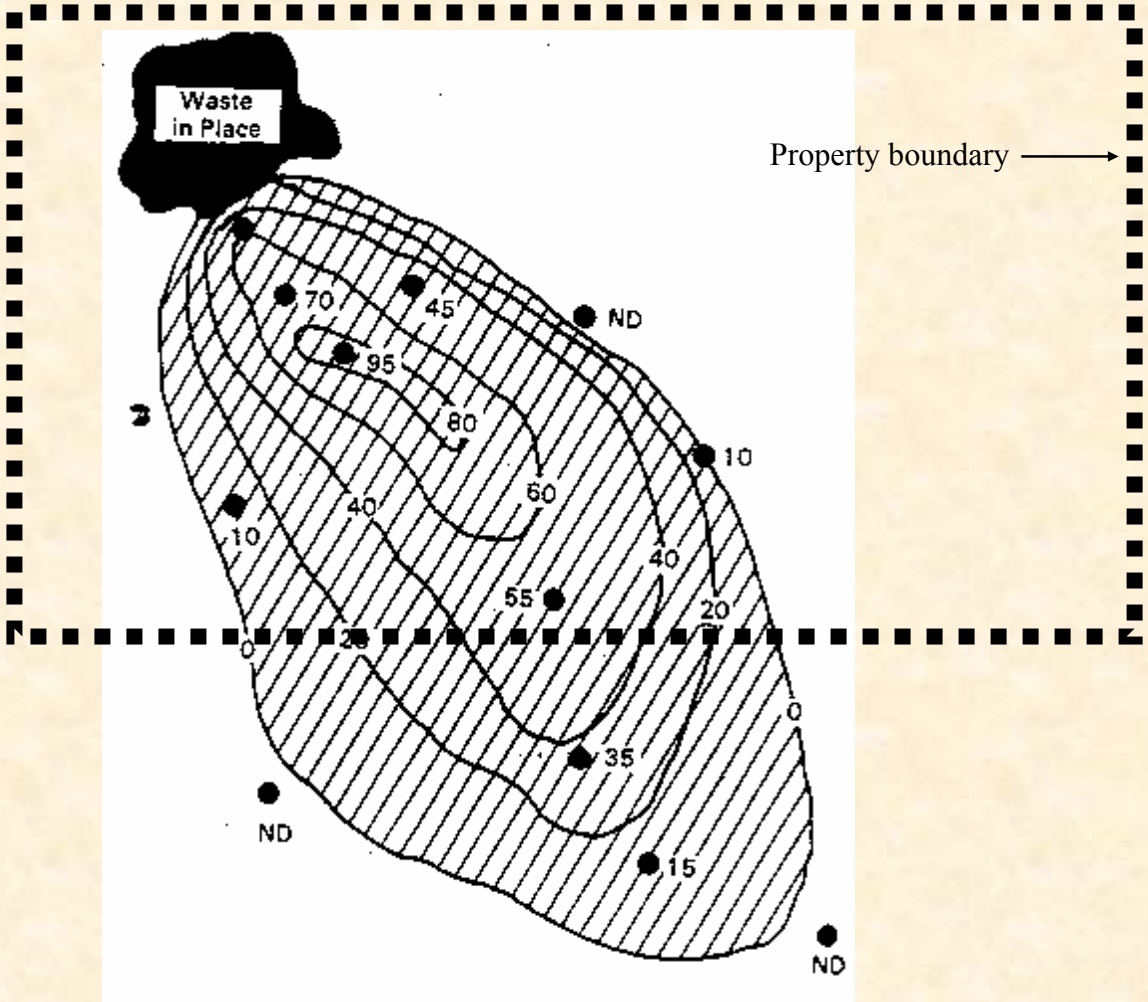
# RCRA Point of Compliance

## Final



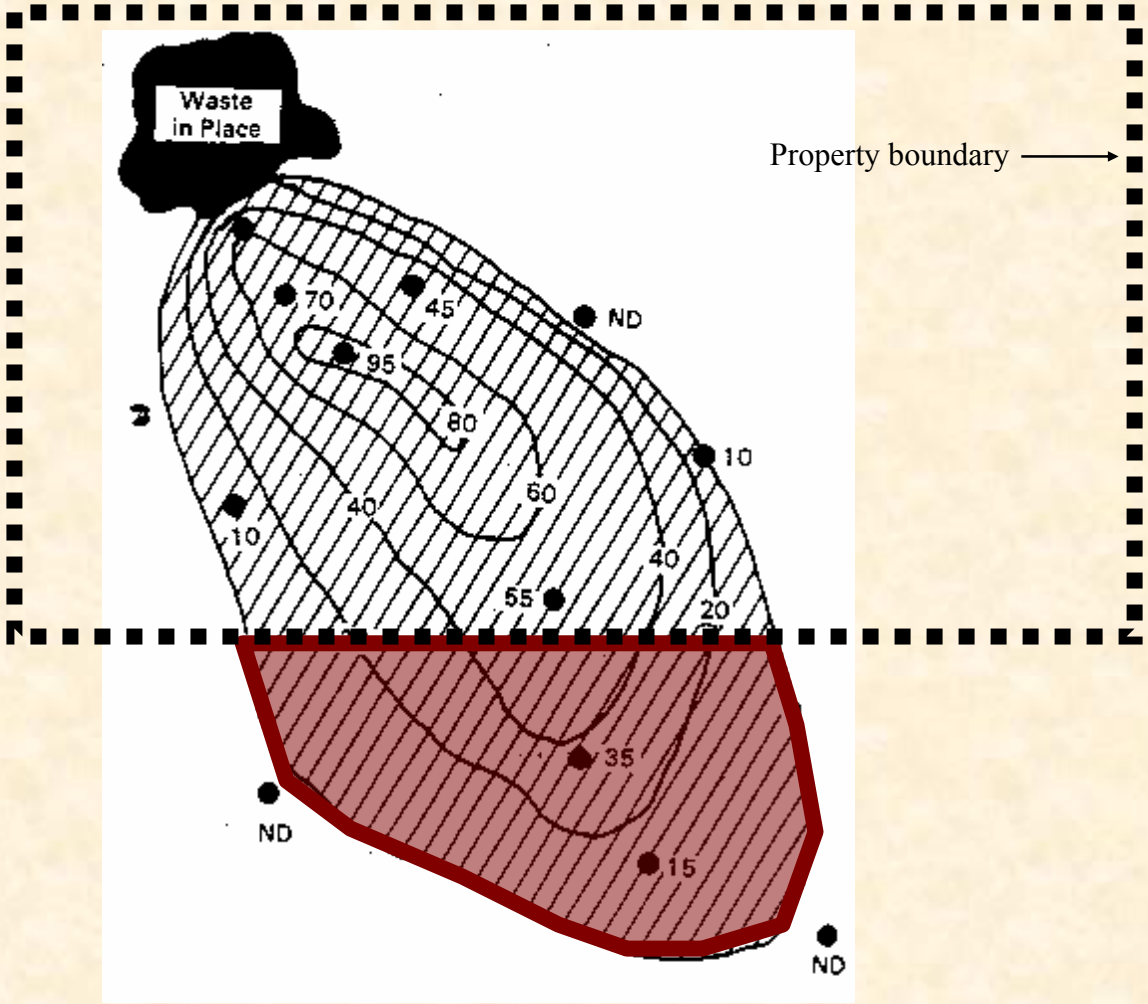
# RCRA Point of Compliance

## Intermediate



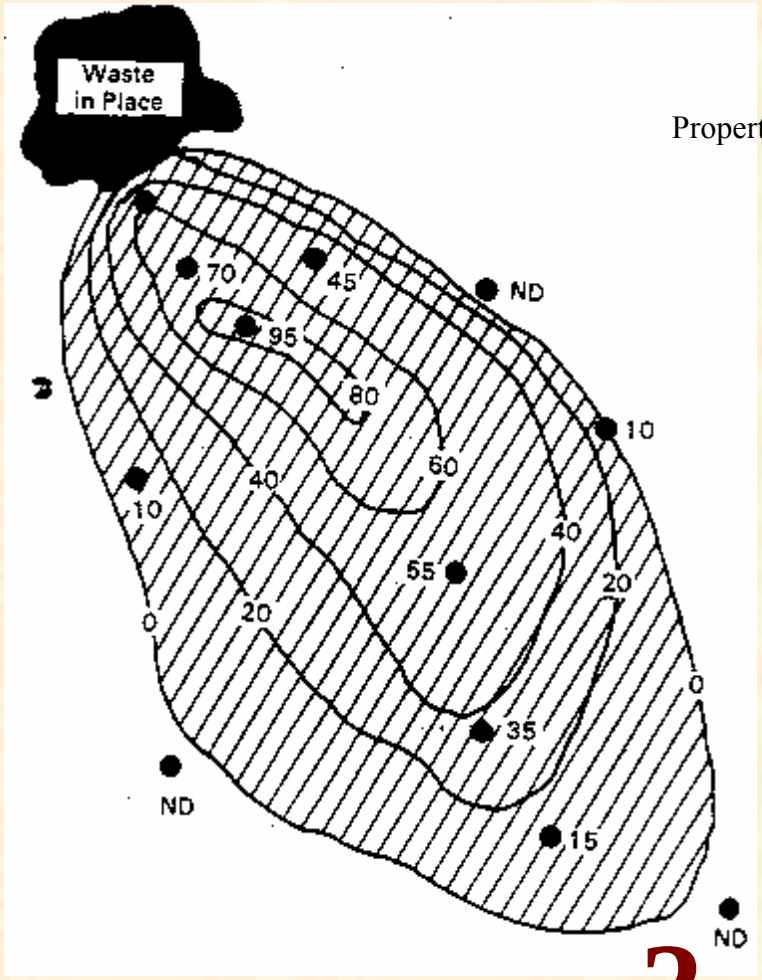
# RCRA Point of Compliance

## Intermediate



# RCRA Point of Compliance

## Intermediate

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# Media Cleanup Objectives

- Cleanup Levels
- Point of Compliance
- **Cleanup Time Frame**

# Cleanup Timeframe

- Facility-specific schedule for the groundwater remedy
  - Time to construct remedy
  - Estimate of time needed to achieve cleanup levels at the Point of Compliance/Area of Attainment
- Should be reasonable given facility-specific conditions
  - Longer timeframes may be acceptable where groundwater is not currently being used for drinking water
  - Shorter timeframes may be needed to control/prevent current or imminent exposure

# Reuse/Redevelopment

- Integration with Corrective Action
- Before, during, after
- Considerations
- Parceling
- Types of reuse
- Timing
- Engineering & Institutional Controls

# Reuse/Redevelopment

- Good reuse:  Intermodal rail/trucking facility at former Bethlehem Steel facility, Bethlehem, PA
- Bad reuse:  Kiddie Kollege daycare in former mercury thermometer factory, Franklin Township, NJ

# Cleanup Technologies

- Removal
  - Excavate
  - Pump
  - Dredge
  - Vapor recovery
- Treatment
  - In situ
  - Ex situ
- Containment
  - Capping
  - Cut off walls

# Monitored Natural Attenuation

- Cleanup approach relying on natural processes and monitoring
- MNA is likely candidate when:
  - Capable of achieving cleanup levels
  - Timeframe reasonable
  - Degradation is dominant process
  - Remedy includes source control
  - Plumes are already stable or shrinking
  - Used in conjunction with active approaches or as a follow-up measure
- Need for contingency remedy
- Trigger or criteria to signal if not working

# Technical Impracticability (TI)

- Situations where achieving groundwater cleanup levels for a final remedy is not practicable from an "engineering perspective"
  - Needs to be technically justified
  - Presence of DNAPL = likely TI
  - Alternative remedial strategy
  - Point of Compliance applies outside TI zone
  - Can be revisited if cleanup becomes "technically practicable" in future

# Corrective Measures Implementation

- Construction Completion
- Operation, Maintenance & Monitoring
- Financial Assurance
- Institutional Controls
- Remedy Completion
  - Complete with controls
  - Complete without controls

# Case Studies

- Genicom – Waynesboro, VA
- Allied/Honeywell – Baltimore, MD
- Marjol Battery – Throop, PA

# Genicom
# Waynesboro, VA

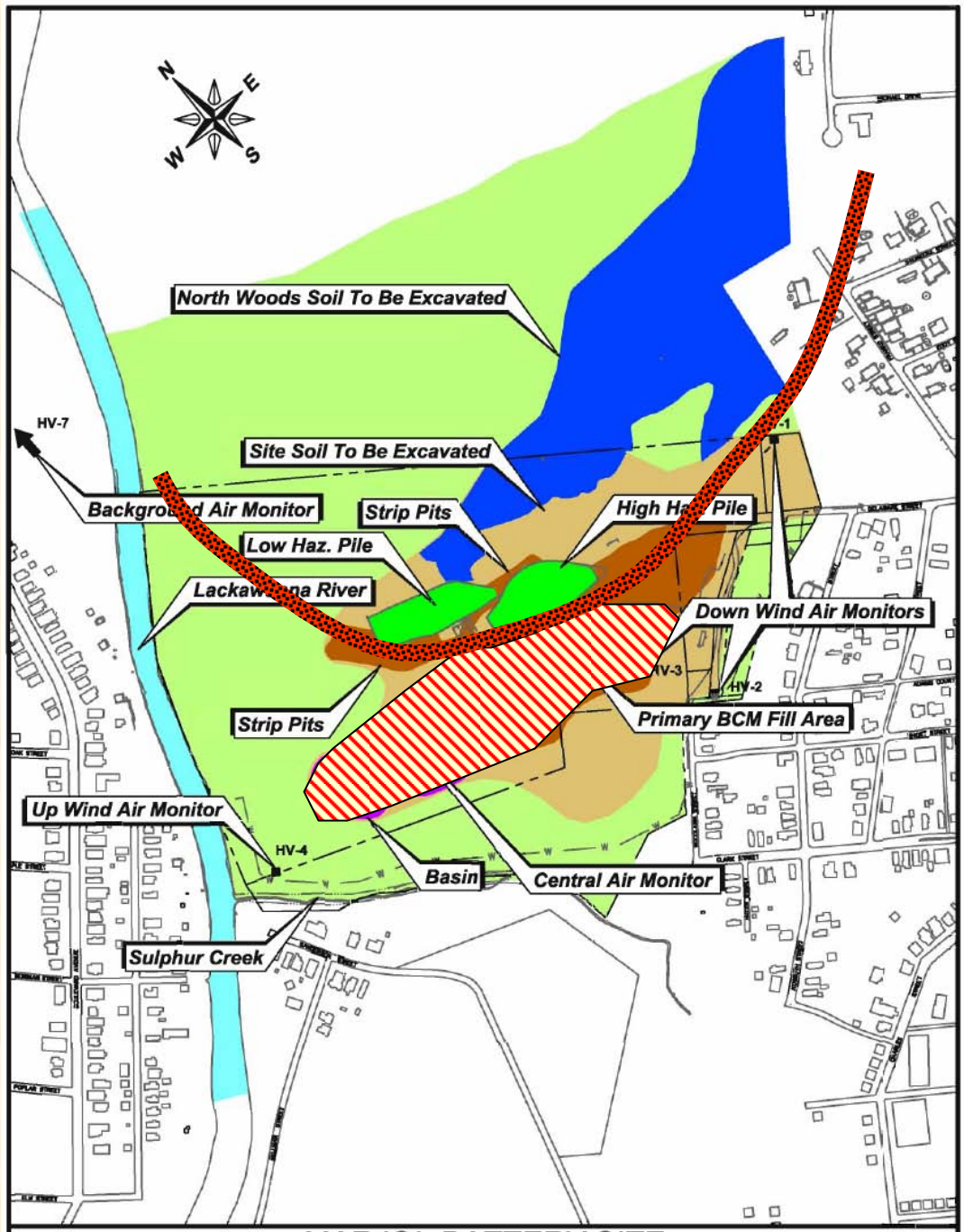
- Electro-mechanical equipment manufacturing
  - GE  1954 - 1983
  - Genicom 1983 – 2000
- Light manufacturing, warehousing & distribution
  - Solutions Way Management 2001 to present
- TCE in groundwater
- Remedy:  Groundwater pump & treat; closure (capping) of regulated surface impoundment

# Allied/Honeywell Baltimore, MD

- Chrome ore processing from mid-19th century to 1985
- Hexavalent chromium in groundwater and adjacent surface water
- Remedy:  Soil bentonite wall; cap; maintain inward hydraulic gradient

# Marjol Battery Throop, PA

- Lead acid battery crushing, lead reclamation, on-site disposal of spent battery casings from 1962 to 1982
- Gould Electronics purchased site in 1980
- Lead in soil, adjacent community
- Remedy:  offsite soil excavation; consolidate soils onsite under cap away from coal seams



MARJOL BATTERY SITE
GENERALIZED SITE MAP

# Resources

- http://www.epa.gov/reg3wcmd/correctiveaction.htm

EPA - Waste and Chemicals Management - Corrective Action - Region 3 - Microsoft Internet Explore...
File Edit View Favorites Tools Help
Back Search Favorites
Address http://www.epa.gov/reg3wcmd/correctiveaction.htm
Go Links
Google Go Bookmarks 128 blocked Check Look for Map AutoFill Send to Settings

U.S. Environmental Protection Agency

# Mid Atlantic Corrective Action

Serving Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, and West Virginia



Corrective Action Home
About Corrective Action
RCRA Facilities
On-Line Resources
Facility Lead Program
Redevelopment
Pennsylvania Memorandum of Agreement

## Resource Conservation and Recovery Act (RCRA) Corrective Action

***Corrective Action is the term the RCRA program uses to describe the investigation and cleanup of facilities that manage hazardous wastes. This page links you to key aspects of the program.***


About Corrective Action


Facilities


On-line Resources


Facility Lead Program


Redevelopment and Reuse


Pennsylvania Memorandum of Agreement

## What's New!

**[Some links in this section are Adobe Acrobat PDF files. About PDF]**

Public Notices

**EPA/State RCRA Corrective Action Workshop** - Held October 10 - 12, 2006, Rocky Gap Lodge, Maryland. The agenda and some presentation have been posted for review.

**DuPont Spruance Site** - On Thursday, November 2, 2006, EPA received a Report from DuPont containing the results of the PFOA /PFOS sampling conducted at the DuPont Spruance Plant during August 2006. The DuPont Spruance site is located just south of Richmond, Virginia. The Report represents Dupont's conclusions and not those of EPA or VDEQ.

**Former Elf Atochem North America Site** - Remedial action is underway at the Former Elf Atochem Facility in Cornwells Heights, Bensalem Township, PA. The five large concrete buildings have been razed and soil removals have begun. The Remedy calls for the removal of approximately 30,000 cubic yards of soils in order to meet the Pennsylvania Department of Environmental Protection Land Recycling Program's residential soil medium specific concentration standards.

From 1917-1997 this 26-acre property situated along the Delaware River was the location for various

## CONTACTS:

Region 3 Corrective Action Directory

EPA Headquarters Corrective Action Website

## State Links

EXIT Disclaimer


Delaware Department of Natural Resources & Environmental Control

Local intranet